

Claims

[c1] I claim:

1. A fluid power apparatus comprising a housing with a bore therein that is divided by a power piston into an inlet chamber and an outlet chamber, said power piston having passage means with an orifice through which said inlet chamber is connected with said outlet chamber, valve means located in said bore for controlling the flow of a fluid under pressure from a source through said passage means, said valve means including a seat surrounding said orifice, a seal, a valve spring and an input rod, said valve spring urging said valve seal into engagement with said input rod to define a working chamber within said passage means, said fluid under pressure flowing from said inlet chamber to outlet chamber by way of said working chamber and orifice, said flow of fluid from said working chamber to said orifice being along a flow path between said seat and said seal and in a rest mode of operation developing a first turbulence that creates a resonant noise within an acceptable audible level while in an actuation mode of operation instituted by said input rod responding to an actuation force from an operator to move said seal toward said seat to

restrict the flow of fluid from said working chamber and cause a corresponding fluid pressure change of the fluid in said inlet chamber that acts on said power piston to create an output force and effect a brake application, said flow of fluid through said orifice during said change in fluid pressure having a second turbulence as fluid is communicated to said outlet port, said valve means being characterized by an annular ring that extends from said seal into said orifice to prevent said second turbulence from impinging on said valve spring and creating a resonant noise therein that exceeds said acceptable audible range.

- [c2] 2. The brake system as recited in claim 1 wherein said annular ring is characterized by a sleeve that is concentric to said orifice such that the flow of fluid is directed along an annular path that is substantially parallel to the axis of a bore of the passage means.
- [c3] 3. The brake system as recited in claim 1 wherein said annular ring is characterized by an annular projection that forms a shoulder that retains said valve spring in an axial location downstream from said orifice.
- [c4] 4. The brake system as recited in claim 3 wherein said passage means includes a second flow path through said seal and input rod for communicating fluid to a chamber.

- [c5] 5. The brake system as recited in claim 1 wherein said passage means includes a flow path through said seal and input rod for connecting said outlet chamber to a reaction chamber.
- [c6] 6. The brake system as recited in claim 5 wherein said annular ring is characterized by a sleeve having a shoulder on a first end for receiving a first end of said valve spring within said orifice and a second end connected to said seal to position said valve spring within said orifice to prevent fluid flow from impinging on said valve spring.
- [c7] 7. The brake system as recited in claim 1 wherein said valve means is further characterized by an annular shroud that concentric to and extends from said annular ring into said passage means, said valve spring being received by said annular shroud to intercept the flow of fluid to said outlet chamber.